Annual Report 1983

Forest Products and Forest Industrial Development Research Program

Alberta
ENERGY AND NATURAL RESOURCES

Alberta
ECONOMIC DEVELOPMENT

ALBERTA RESEARCH COUNCIL

84- 3406 /

Forest Products and Forest Industrial Development Research Program Annual Report

1983

To:

Mr. F. W. McDougall
Deputy Minister of Energy and Natural Resources
Edmonton

Mr. D. J. Gendall
Deputy Minister of Economic Development
Edmonton

Dr. R. Green, Deputy President, Alberta Research Council
Edmonton

Sirs:
I have the honor to present the first Annual Report relating to the Forest Products and Forest Industrial Development Research Program for the fiscal year ending March 31, 1983.

Respectfully submitted,

J. A. Brennan,
Chairman
Management Committee

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Highlights

The fiscal year 1982/83 marked the first year of operation for the Forest Products and Forest Industrial Development Research Program. The program has two thrusts — strategic studies and forest products research and development.

This annual report covers the period April 1, 1982 to March 31, 1983 and outlines details of the 8 strategic studies projects and 16 forest products research and development projects initiated during the year.

Highlights include:

- completion of three strategic studies projects: Alberta Pulp Chip Pricing Study; Forest Research Needs for the Management of Aspen and Poplar in Alberta; Newsprint from Alberta Woods;
- significant progress in several ongoing forest products research and development projects;
- agreement with a Japanese plywood association to fund jointly a plywood research and development project using Alberta aspen;
- evidence that it is technically and economically feasible to produce a high-yield pulp from typical quality Alberta aspen logs;
- design and construction of a prototype for machine stress rating full-size panelboard;
- as a result of joint research and development work, a proposal was submitted by a major Alberta company to cooperate in establishment of an aspen pilot plant for glued aspen products;
- indications that Alberta aspen and pine are suitable for shingles.

Background

Alberta's forest and forest products primary industries are an important economic force, accounting for more than 11 percent of manufacturing-sector employment in the province and generating roughly $724 million worth of products in 1982. The province's forest resources, however, in terms of both softwood (spruce and pine) and hardwood (aspen and balsam poplar) are far from fully developed. As a result, only about one-third of Alberta's annual allowable cut is presently used.

It has been estimated that in addition to the 7 million cubic metres of softwood currently harvested every year in Alberta, another 20 million cubic metres of softwood and hardwood could be cut annually on a sustained yield basis. This potential harvest could dramatically increase manufacturing opportunities in such fields as structural wood products, pulp and paper, energy, wood-based industrial chemicals and feed products.

One of the major reasons for underutilization of Alberta forests has been the presence of vast stands of poplar, a hardwood considered unmerchantable because of its unsuitability for conventional forest products such as lumber, veneer and pulp and paper. In recent years, however, the Alberta government has become increasingly aware of the potential of this virtually untapped resource. Accordingly, planning began for a comprehensive program aimed at not only solving the problem of poplar utilization, but also enhancing development of Alberta's forests as a whole.

Two components were envisioned: a number of strategic studies designed to determine the quality of the forest resource in Alberta and to investigate market opportunities; an ongoing forest products research and development program focused primarily on the hardwood resource.

Impetus for the program came from the three provincial agencies primarily concerned with the development of Alberta's forest industry: Alberta Energy and Natural Resources, responsible for the utilization, development, management and protection of Alberta's forest resources; Alberta Economic Development, which oversees product and market development and encourages industrial development in Alberta; the Alberta Research Council, which conducts the forest products research program and acts as technical consultant to both Energy and Natural Resources and Economic Development.

As a result of recommendations by an advisory committee representing the three government agencies, industry and the University of Alberta, a permanent Forest Products and Forest Industrial Development Research Program was created on April 1, 1982. The Alberta Research Council was chosen to house the new program because of its mandate, structure and rapport with industry and a forest products research and development program was already incorporated into the Alberta Research Council's Long Range Plan.

During 1982/83 a modest laboratory for testing and forest products development was established at the Alberta Research Council's Parsons Property building in Edmonton.

Management Committee

The Ministers of Energy and Natural Resources and Economic Development and the President of the Alberta Research Council agreed upon the following terms for the operation of the Management Committee:

- the Committee will consist of the Assistant Deputy Minister (or his designate) from each department and the Vice-President, Industrial and Engineering Research Division (or his designate) from the Alberta Research Council;
- the Assistant Deputy Minister of Energy and Natural Resources will act as Chairman of the Management Committee;
- based on proposals made by or acceptable to the Committee, the Committee will agree in principle on the broad scope of the long-term work to be carried out under the auspices of the Forest Products and Forest Industrial Development Research Program.

The Committee will meet periodically to review progress and to agree upon the projects that will comprise the research and strategic studies program for the one-year period immediately ahead. A review of the previous year's progress will also be carried out.

Once agreement has been reached on the list of projects for the one-year period immediately ahead, arrangements will be made by Energy and Natural Resources to transfer to the Alberta Research Council and Economic Development the funds necessary for carrying out their respective projects for the year.

The Committee shall be responsible for coordinating all government funded research pertaining to forest products and forest industrial development.

On March 31, 1983 the Management Committee members were:

Alberta Energy and Natural Resources
Mr. J.A. Brennan
Assistant Deputy Minister
Alberta Forest Service

Alberta Economic Development
Mr. K.H.G. Broadfoot
Assistant Deputy Minister
Development and Trade

Alberta Research Council
Dr. D.L. Mitchell
Vice-President
Industrial and Engineering
Research Division

Non-voting members on the Management Committee were:

Mr. B.W. Karaim (Secretary)
Forest Products Advisor
Alberta Forest Service

Mr. R.G. Anderson
Director
Forest Industries Section
Alberta Economic Development

Dr. L. Bach
Manager
Forest Products Program
Alberta Research Council

Mr. A.A. Roehl
Head
Chemical and Materials
Engineering Department
Alberta Research Council

Program objectives and guidelines

The Forest Products and Forest Industrial Development Research Program has three basic objectives:

- to increase and improve the commercial utilization of Alberta's forest resources;
- to promote and support research in the development and efficient use of Alberta's existing and potential forest resources;
- to encourage the development of Alberta-based scientific and technical expertise in the field of forest products.

Proposals for specific research projects are reviewed and assessed within the context of the following program guidelines.

Eligible research projects shall include those relating to resource and industrial development assessment, forest products, production, marketing, transportation, and utilization of Alberta's forest resources.

Preference will be given to applied or mission-oriented research projects, although some consideration will be given to funding of appropriate basic research projects.

Consideration will be given, under certain circumstances, to proposals for construction of new or improved physical facilities for research related to forest products in Alberta.

The Alberta-based private sector will be encouraged to participate in the program, through submission of appropriate research proposals and through its advice as requested.

Most approved projects will be carried out under a legal agreement between Alberta Energy and Natural Resources, Alberta Economic Development or the Alberta Research Council and the researchers, specifying the terms and conditions under which the research funds will be expended, and under which the technology will be disclosed, owned and licensed.

Those interested in further information about this report or any of the project summaries featured on the following pages are invited to address their requests to:

The Chairman, Forest Products and
Forest Industrial Development
Research Program
Alberta Energy & Natural Resources
10th Floor South, Petroleum Plaza
9915 - 108 Street
Edmonton, Alberta
T5K 2C9

Strategic studies projects

Project:
Decay of aspen and balsam poplar in Alberta — a literature review and problem analysis.

Objective:
To produce a manuscript for an information publication on aspen/poplar decay in Alberta.

Project responsibility:
Alberta Forest Service/Alberta Energy Co. Ltd.

Investigators:
Canadian Forestry Service

Source of funding:
Forest Products and Forest Industrial Development Research Program (50%) and Alberta Energy Co. Ltd. (50%).

Results as of March 31, 1983:
A draft manuscript submitted, reviewed and returned for revision.

Implications:
A handbook for forest managers and operators harvesting poplar that describes operating guidelines relating to the decay in commercial stands.

Conclusions:
N/A

Further work:
Publication of an Information Report.

Project:
Forest research needs for the management of aspen and poplar in Alberta.

Objective:
To provide the forestry-related information required by the Alberta government to formulate a comprehensive poplar research and development strategy and to identify gaps and deficiencies in such information and recommend appropriate action.

Project responsibility:
Alberta Forest Service

Investigators:
W. R. Dempster and Associates Ltd.

Source of funding:
Forest Products and Forest Industrial Development Research Program.

Results as of March 31, 1983:
- Deciduous AAC in Alberta is 11.7 MM m^3 of which only 1 percent is being utilized.
- Low level of poplar utilization due to a number of causes — tree size, quantity, decay, access, logging and conversion technology. To some extent these can be controlled by the forest manager.
- Aspen is a major component of Boreal Forest; it is a pioneer species in Alberta; has a short rotation and therefore is succeeded by other species.
- Exhibits asexual reproduction; suckers from roots; same root forms clone.
- Grows best on porous loamy soils.
- Aspen has low fire potential and has been considered for use as fire break in coniferous stands.
- Clearcutting is most effective harvesting method for regeneration.
- Scarification inhibits regeneration and stand is more susceptible to disease.
- Winter is best time to harvest as low carbohydrate level in soil leads to less suckering.
- Aspen thins itself naturally and does not require precommercial thinning.
- Pathological rotation age for aspen growing on the prairies is 30 to 50 years.
- Biomass volumes are optimum between 10 to 20 years but nutrient loss too great for rotations less than 15 years; moderate loss 20 to 40 years.
- Suckers can be prepared from root cuttings but to regenerate this way would be costly and inefficient due to low ratio of suckers to length of root cuttings.
- There have been attempts to convert aspen stands to conifers via mechanical, chemical and prescribed burning treatments, but application of herbicides would appear to be most effective and economic.
- Most common type of decay causing fungi is fomes igniarius, which is characterized by the visual presence of conks.
- Hypoxylon cankers kill 1 to 2 percent of aspen per year; common to young aspen; understocked stands are more susceptible; trees die in 8 to 10 years.

- Incidence of decay is strongly related to age.
- Definitely genetic differences between clones allowing selection to increase growth and disease resistance however, this type of improvement will be expensive.

Implications:
Background information for developing research and development strategy.

Conclusions:
- Alberta government should investigate the feasibility and cost-effectiveness of differentiating hardwood species on both conventional and unconventional aerial photography.
- There is a need to be able to produce yields in juvenile and regenerated stands, especially in mixed coniferous-deciduous situations. Research into stand yield prediction using simulation-modelling techniques, conducted by the CFS and U of A should be supported morally and financially. Joint cooperation through the management committee is suggested.
- Additional work is needed to relate the dynamics and extent of hardwood decay to age and site. A study should be designed and interpreted by a multidisciplinary team. Information to be acquired through a stratified scheme whereby decay is destructively sampled by yield class, age class and volume sampling region, preferably with clonal variation recognized and partitioned.
- High priority should be given to the development of a simple workable system for predicting delivered cost from inventory variables and location, and applying system to production of supply curves. Will require multi-disciplinary team.
- Identification of decadent stands that require treatment. Next application of practical treatment to develop and test alternative treatment.
- Need to be able to predict yields in mixed wood stands. Also ability to control or manipulate species composition. Conversion from mixedwood or hardwood to softwood best achieved through herbicide application.

Highest priority:
To develop techniques for prediction of yield, quality and economic operability.

Further work:
Contract study to develop a simple workable system for predicting delivered cost of poplar from inventory variables and location.

Project:
To review the pulp chip pricing system in Alberta.

Objective:
To review the present pulp chip pricing systems in Alberta, and to indicate problems; identify and evaluate alternative pricing systems and pricing targets for pulp chips in Alberta; to assess their consequences and recommend the best solution to the chip pricing problem from an economic, industry and government point of view.

Project responsibility:
Alberta Economic Development

Investigators:
Bowell Consultants Ltd.

Source of funding:
Forest Products and Forest Industrial Development Research Program.

Results as of March 31, 1983:
- Residual chips from sawmills supply 55 percent of Alberta's pulp mill fiber requirements; of this, 76 percent is outside purchases from independent sawmills.
- Of Alberta's 28 sawmills producing over 5 million fbm/yr only 9 supply chips to Alberta's two pulp mills. In addition, 29 smaller sawmills produce virtually no chips.
- Residual chips cost $22 to $28 less than roundwood chips.
- Chip revenue is a large factor in sawmill profits.
- Alberta's chip market is an unregulated open market system influenced by a multitude of factors.
- Trend in Alberta is toward increased chip production from sawmills and increased utilization of residual chips by the pulp mills.
- If Alberta pulp mills could use less roundwood chips and more residual chips, or if lower transportation costs could be achieved, they could pay more for residual chips.

Implications:
Recommendation of an optimum integrated development for the Athabasca forest.

Conclusions:
- The Alberta government should continue to apply chip direction policies as necessary to secure added pulp capacity in the province and the chip market should be left to function as an open market.
- The Alberta government should encourage further pulp capacity and more chip demand, through larger and more modern sawmills that could supply more chips to the next integrated complex development.

Further work:
Product-specific market studies.

Project:
Evaluation of Alberta's secondary forest products manufacturing industry.

Objectives:
- To identify the current status of manufacture and consumption of secondary solid wood products in Alberta.
- To identify the existing and the potential market for secondary manufactured solid wood products in Alberta.
- To evaluate the opportunity for government initiatives to encourage improved utilization of the indigenous species in Alberta for secondary manufactured products.

Project responsibility:
Alberta Economic Development

Investigators:
Hallmark Engineering Ltd. and Woodbridge Reed and Assoc. Ltd.

Source of funding:
Forest Products and Forest Industrial Development Research Program.

Results as of March 31, 1983:
Draft report submitted, reviewed and request for revisions made.

Implications:
Identification of secondary manufacturing development opportunities in Alberta.

Conclusions:
N/A

Further work:
Product-specific market studies.

Project:
Market assessment for poplar products.

Objective:
To determine both the existing and potential markets for products manufactured from the poplar resource of western Canada.

Project responsibility:
Alberta Forest Service

Investigators:
Carroll-Hatch (International) Ltd.

Source of funding:
Forest Products and Forest Industrial Development Research Program (25%); British Columbia government (25%); federal Department of Regional Economic Expansion (50%).

Results as of March 31, 1983:
Draft report submitted, reviewed and request for revisions made.

Implications:
Identification of potential products and markets that can be manufactured from the poplar resource.

Conclusions:
N/A

Further work:
May require site specific feasibility studies.

Project:
Processing of Alberta aspen into Japanese veneer and plywood.

Objective:
To determine the technical and economic feasibility of using Alberta aspen to produce Japanese veneer and plywood.

Project responsibility:
Alberta Forest Service

Investigators:
Shimane-Ken Plywood Association, Mitsue, Japan

Source of funding:
Forest Products and Forest Industrial Development Research Program.

Results as of March 31, 1983:
500 m^3 of aspen logs were selected and prepared for shipment to Japan.

Implications:
Successful processing and marketing trials in Japan could result in new development opportunities in Alberta.

Conclusions:
N/A

Further work:
To obtain results of processing in Japan as well as sample sheets of plywood for testing at Alberta Research Council.

Project:
To determine the competitiveness of the Albertan versus the U.S. southeastern forest industry.

Objective:
To determine the comparative feasibility of an integrated forest industry complex in Alberta versus a similar complex in southeastern U.S.

Project responsibility:
Alberta Economic Development

Investigators:
Jaakko Poyry International Oy

Source of funding:
Forest Products and Forest Industrial Development Research Program.

Results as of March 31, 1983:
Progress report indicated that the study is 90 percent complete.

Implications:
Recommendation of an optimum integrated development for the Athabasca forest.

Conclusions:
N/A

Further work:
Product-specific market studies.

Project:
An evaluation of the suitability of Alberta wood for newsprint using CIP's SCMP process.

Objective:
To carry out a preliminary evaluation of the suitability of softwood (lodgepole pine and white spruce) and hardwood (aspen and balsam poplar) in the O'Chiese Timber Development Area for use in the TMP and SCMP processes.

Project responsibility:
Alberta Forest Service

Investigators:
CIP Research Ltd. - Hawkesbury, Ontario.

Source of funding:
Forest Products and Forest Industrial Development Research Program.

Results as of March 31, 1983:
Alberta softwood blend (spruce and pine) makes very high quality TMP. Burst index, breaking length, wet web tensile and brightness are much better than TMP made from Quebec softwood (eastern spruce and balsam fir).

Poplar responded well to SCMP pulping. A blend of 60 percent poplar and 40 percent softwood gave comparable strength to that obtained from 100 percent softwood chips from Quebec. Opacity of the poplar-softwood SCMP is somewhat low, but can probably be corrected by modifying the refining procedure.

Implications:
Both TMP and SCMP processes could be logical candidates for inclusion in a development proposal for the Brazeau TDA.

Conclusions:
A furnish consisting of TMP from softwoods and SCMP from the hardwood-softwood mixtures of the type available in the O'Chiese Block should be a prime candidate for the manufacture of newsprint.

Further work:
None anticipated.

Forest products research and development projects

Project:
Establishment of a modest forest products testing and development laboratory at the Alberta Research Council.

Objective:
To provide capability in Alberta to perform standard, physical, mechanical and chemical testing of wood grown and wood products manufactured in Alberta.

Project responsibility:
Alberta Research Council

Investigators:
Alberta Research Council

Source of funding:
Forest Products and Forest Industrial Development Research Program.

Results as of March 31, 1983:
1000 ft² of laboratory space was obtained at the U of A for small-scale testing in close cooperation with the University of Alberta Wood Science/Forest Products Activities. 2000 ft² of space was provided by the Alberta Research Council at the Parson's Warehouse Facility to house larger-scale testing equipment. The following equipment was specified, ordered, delivered and installed by March 31, 1983: post flexure machine, E-Computer, creep-jigs, shear testing machine, loadcells, LVDTs, data recording equipment.

Implications:
The Alberta Research Council now is capable of doing a number of the most common mechanical tests pertaining to wood-based panel products.

Conclusions:
A start has been made towards establishing a modest forest products laboratory at the Alberta Research Council.

Further work:
Plans are to add concentrated load equipment for panel products, machine stress rating equipment and some product development equipment in 1983/84.

Project:
To conduct specific performance and code acceptance tests on Alberta plywood.

Objective:
To generate enough data to support a submission for code approval of Alberta-made spruce plywood as a structural material with allowable unit design stresses. Presently only Douglas-fir plywood is accepted for use where engineering design is required under the building codes.

Project responsibility:
Alberta Research Council

Investigators:
Western Plywood Manufacturers Association

Source of funding:
Forest Products and Forest Industrial Development Research Program.

Results as of March 31, 1983:
Representative samples of spruce plywood were sent from Alberta mills to Council of Forest Industries of B.C. testing facility for CSA - 086 testing. Test associated with Product Standard CSA - 0151 has been completed by Forintek.

Implications:
Increased markets for Alberta plywood.

Conclusions:
N/A

Further work:
To complete testing and submit data to support inclusion of softwood plywood in CSA - 086.

Project:
To develop a non-destructive stress rating method for panelboard products.

Objective:
To assist industry in achieving and improving market acceptance for Alberta products.

Project responsibility:
Alberta Research Council

Investigators:
Alberta Research Council and Porter Engineering Ltd.

Source of funding:
Forest Products and Forest Industrial Development Research Program.

Results as of March 31, 1983:
Prototype equipment has been constructed to provide machine stiffness ratings of full-size panelboard products.

Implications:
This project could lead the panel industry to a new cost efficient quality control and grading system.

Conclusions:
Alberta Research Council would appear to be a leader in North America of non-destructive stiffness rating of full-size panels.

Further work:
To pursue further testing of prototype equipment with the object of designing and constructing a commercial system at an existing plant.

Project:
Determine yield and quality of a high yield pulp produced from Alberta aspen.

Objective:
To assist industry planning to use aspen chips in pulp mills by establishing quantitative relationship between yield and predetermined levels of decay in aspen.

Project responsibility:
Alberta Research Council

Investigators:
Woodbridge, Reed and Associates and Econotech Ltd.

Source of funding:
Forest Products and Forest Industrial Development Research Program.

Results as of March 31, 1983:
Report submitted on the effects of decay on pulp yield for the bleached chemi-thermomechanical pulp process (BCTMP).

Implications:
It appears technically feasible to use the entire Alberta aspen resource for BCTMP pulp.

Conclusions:
It has been shown that it is technically and likely economically feasible to produce a high yield pulp from aspen logs from any of the mature stands in Alberta.

Further work:
To proceed with a larger study regarding decay separation and pulping trials.

Project:
Technical evaluation of finger jointing, edge gluing and lamination of aspen lumber.

Objective:
To develop value added uses for aspen and encourage further utilization of aspen.

Project responsibility:
Alberta Research Council

Investigators:
Canadian Forest Products Ltd. and the Alberta Research Council

Source of funding:
Forest Products and Forest Industrial Development Research Program.

Results as of March 31, 1983:
A quantity of clear aspen lumber has been finger-jointed and laminated into beams and Japanese "baby squares."

Implications:
New market opportunities for Alberta aspen products.

Conclusions:
Samples look very good and have received favorable comments from end users.

Further work:
Structural testing of beams, edge-gluing for furniture blanks, veneering of squares. Engineering and feasibility study for commercial/demonstration facility. Machine stress rating (MSR) of finger-jointed aspen lumber. Durability testing.

Project:
Development of a computer optimization model for reconstituted wood panel products industry in Alberta.

Objective:
To assist present industry to improve overall process efficiency in panelboard manufacturing.

Project responsibility:
Alberta Research Council

Investigators:
Alberta Research Council and the University of Alberta

Source of funding:
Forest Products and Forest Industrial Development Research Program.

Results as of March 31, 1983:
A first generation model has been developed — now seeking a company to test and refine model.

Implications:
Potential profit improvement in Alberta waferboard manufacturing.

Conclusions:
The model is promising and should be developed further in close cooperation with industry.

Further work:
Requires cooperation of industrial partner to test model and refine it.

Project:
Technical assessment of jackpine and aspen shingles pressure treated with wood preservatives and fire retardants.

Objective:
Through retention and performance tests to determine the acceptability of jackpine and aspen as suitable species on which to base a shingle industry in Alberta.

Project responsibility:
Alberta Research Council

Investigators:
Cold Lake Indian Band, the Alberta Research Council, and a number of private companies.

Source of funding:
Forest Products and Forest Industrial Development Research Program.

Results as of March 31, 1983:
36 squares of jackpine and aspen shingles have been cut and treated. One roof on a house has been shingled at Cold Lake and a 120′ × 8′ test frame has been installed at the U. of A.

Implications:
Potential new industry in Cold Lake.

Conclusions:
Technical feasibility demonstrated for cutting and impregnating pine and aspen shingles from Cold Lake.

Further work:
Continuous monitoring of performance at both sites.

Project:
Development of new products from aspen bark.

Objective:
To upgrade value of waste products and simultaneously improve resource utilization and economic feasibility of an integrated aspen manufacturing facility.

Project responsibility:
Alberta Research Council

Investigators:
Alberta Research Council and Northern Alberta Institute of Technology.

Source of funding:
Forest Products and Forest Industrial Development Research Program.

Results as of March 31, 1983:
Approximately one ton of finely granulated bark has been produced. A small amount will be used in molded PF (phenolformaldehyde) and PVC (polyvinyl chloride) and mechanically tested.

Implications:
A technique is now available for producing wet granulated aspen in semi-commercial quantities. Finely granulated aspen bark has the potential for being used as a filler or extender for molded plastic products.

Conclusions:
N/A

Further work:
To establish the relationship between filler content and physical-mechanical properties in several thermoplastic and thermosetting resins used in molded plastics.

Project:
To assess new drying methods for aspen lumber.

Objective:
To reduce both drying time and defects for aspen lumber.

Project responsibility:
Alberta Research Council

Investigators:
Forintek

Source of funding:
Forest Products and Forest Industrial Development Research Program.

Results as of March 31, 1983:
Forintek has completed a study on high temperature drying of aspen.

Implications:
Potential cost saving for Alberta sawmills cutting aspen for secondary manufacturing.

Conclusions:
Substantial reduction in drying times for aspen can be achieved through high temperature steam drying.

Further work:
To proceed as requested by the Management Committee.

Project:
To demonstrate ways of upgrading Alberta sawmills.

Objective:
To improve cutting techniques for frozen wood.

Project responsibility:
Alberta Research Council

Investigators:
Forintek

Source of funding:
Forest Products and Forest Industrial Development Research Program.

Results as of March 31, 1983:
A report and film on cutting frozen wood will be available.

Implications:
Potential higher yield in conversion of logs to lumber in Alberta mills.

Conclusions:
An improved sawtooth design has been identified.

Further work:
Conduct mill trials to confirm the finding.

Project:
To examine the effect of extreme temperatures on the mechanical behavior of aspen.

Objective:
To make adjustments and redesign equipment for processing aspen to improve overall efficiency and utilization.

Project responsibility:
Alberta Research Council

Investigators:
Alberta Research Council

Source of funding:
Forest Products and Forest Industrial Development Research Program.

Results as of March 31, 1983:
Four experimental jigs, designed and constructed for studies of the time-dependent flexure of wood products under sustained loading, were designed and constructed but no specific research projects were carried out.

Implications:
Alberta Research Council now has the know how and has developed procedures to conduct experiments pertaining to the rheology of panel products.

Conclusions:
N/A

Further work:
To study the mechanics of producing strands from steamed aspen to be used in structural strandboard products.

Project:
To evaluate chemical properties of healthy and decayed aspen with focus on lignin and hemicellulose.

Objective:
Identify advantages and disadvantages of using aspen to produce wood chemicals.

Project responsibility:
Alberta Research Council

Investigators:
Alberta Research Council

Source of funding:
Forest Products and Forest Industrial Development Research Program.

Results as of March 31, 1983:
Preliminary tests support preparation of proposal for another phase of this project to identify specifically the chemical structure of aspen lignin and hemicellulose.

Implications:
Potential new aspen products.

Conclusions:
N/A

Further work:
Continue work based on identifying the chemical structure of aspen lignin.

Project:
To determine the anatomical, mechanical and physical properties of Alberta aspen.

Objective:
To relate these characteristics directly to specific end uses for aspen to facilitate optimum management of this species.

Project responsibility:
Alberta Research Council

Investigators:
University of Alberta, State University of New York, Alberta Research Council

Source of funding:
Forest Products and Forest Industrial Development Research Program.

Results as of March 31, 1983:
Phase I entailed a preliminary wood quality study on the physical and mechanical properties of aspen as they relate to fiber structure, chemical composition and level of fungal decay. A study of the ultrastructure of healthy and decayed aspen was completed at the State University of New York in Syracuse.

Implications:
Raw material evaluation is of significant importance to any new and old forest products industry in Alberta.

Conclusions:
Several interesting findings pertaining to wood fiber qualities have been identified. This information is vital to present and future manufacturing of forest products based on aspen.

Further work:
To continue with Phase II on the technical wood quality evaluations of Alberta aspen, when requested by the Management Committee.

Summary of expenditures

Pursuant to the terms of the program, a sum of $450,000 was transferred from Energy and Natural Resources to the Alberta Research Council by March 31, 1983 in support of the forest products research and development program. The Alberta Research Council contributed a further $75,000 for a total 1982/83 annual forest products research and development program budget of $525,000.

The forest industrial development portion of the program received funding in the amount of $450,000.

The total allocated to the Forest Products and Forest Industrial Development Research Program was $975,000.

The total expenditures on approved projects as of March 31, 1983 were $991,049.